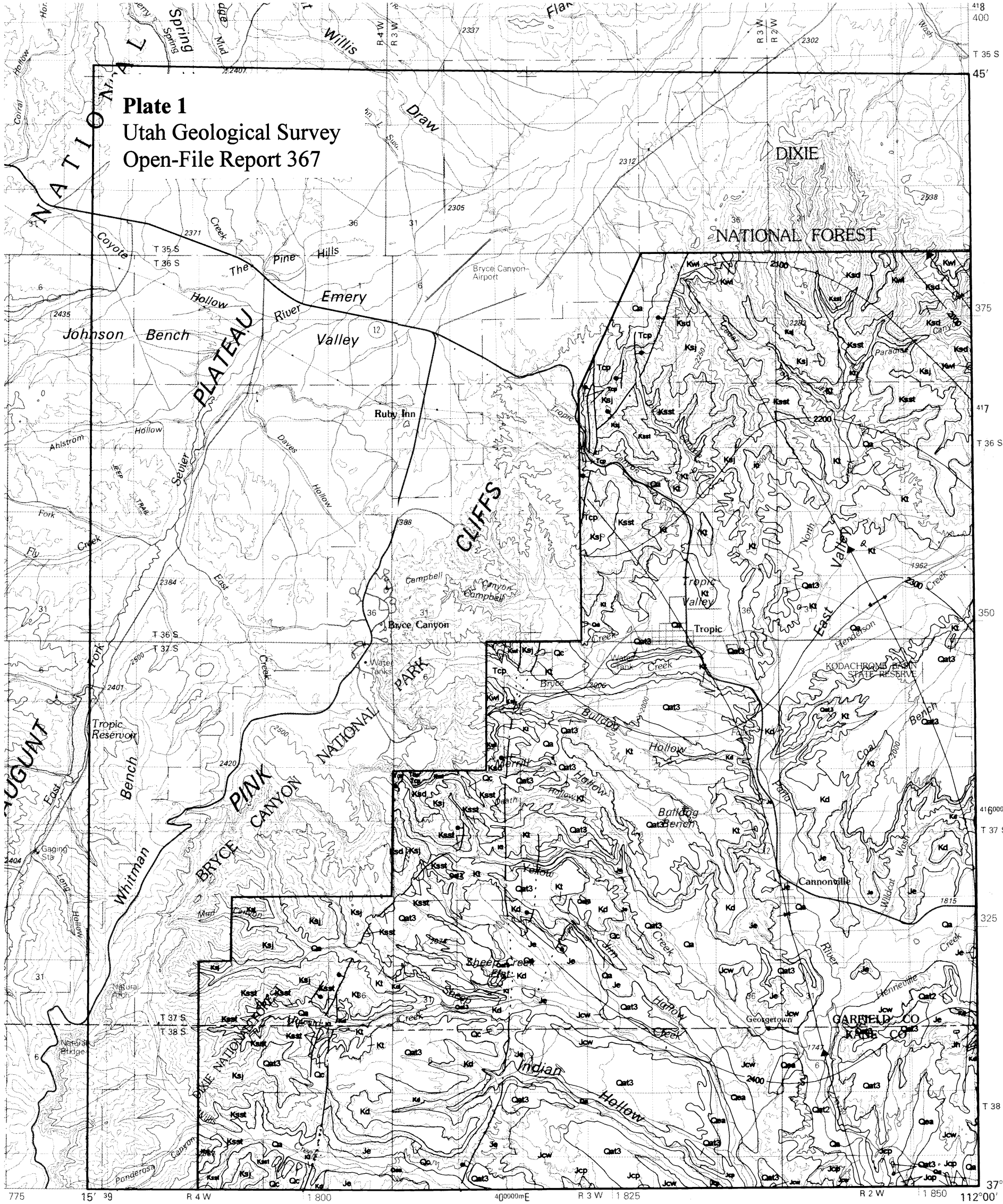
Plate 1
Utah Geological Survey
Open-File Report 367



15 000 20 000 METERS
50 000 60 000 70 000 FEET

PANGUITCH, UTAH
N3730–W11200/30 X 60

1980

INTERIM GEOLOGIC MAP OF THE SE PART OF THE PANGUITCH 30' X 60' QUADRANGLE, GARFIELD AND KANE COUNTIES, UTAH

compiled by
Hellmut H. Doelling
and
Grant C. Willis
Utah Geological Survey

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UTAH GEOLOGICAL SURVEY
a division of
Utah Department of Natural Resources

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2/99

Interim Geologic Map of the Southeast Part of the Panguitch 30'x60' Quadrangle, Garfield and Kane Counties, Utah

compiled by

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Utah Geological Survey
a division of
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Introduction

This interim geologic map of the southeast part of the Panguitch 30'x60' quadrangle was prepared in conjunction with geologic maps of the adjacent Kanab, Escalante, and Smoky Mountain 30'x60' quadrangles to provide complete map coverage of Grand Staircase-Escalante National Monument. The Monument extends about 2 miles (3.2 km) into the Panguitch 30'x60' quadrangle; the map boundaries were selected to include a small zone outside of the Monument (see index map on border of the geologic map). Companion maps by the Utah Geological Survey covering the rest of the Monument are:

Doelling, H.H., compiler, 1998, Interim geologic map of the Smoky Mountain 30'x60' quadrangle, Kane and San Juan Counties, Utah and Coconino County, Arizona: Utah Geological Survey Open-File Report 359, scale 1:100,000.

Doelling, H.H., compiler, 1999, Interim geologic map of the Kanab 30'x60' quadrangle, Kane and Washington Counties, Utah and Coconino and Mohave Counties, Arizona: Utah Geological Survey Open-File Report ---, scale 1:100,000.

Doelling, H.H., and Willis, G.C., compilers, 1999, Interim geologic map of the Escalante and parts of the Loa and Hite Crossing 30'x60' quadrangles, Garfield and Kane Counties, Utah: Utah Geological Survey Open-File Report ---, scale 1:100,000.

Sources of Geologic Mapping for the Interim Geologic Map of the Southeast part of the Panguitch 30'x60' Quadrangle

Bowers, W.E., 1991, Geologic map of Bryce Canyon National Park and vicinity, southwestern Utah: U.S. Geological Survey Miscellaneous Investigations Series Map I-2108, scale 1:24,000.

Doelling, H.H., and Davis, F.D. (compilers), 1989, Geologic map of Kane County, Utah: Utah Geological and Mineral Survey Map 121 (also published with Utah Geological Survey Bulletin 124), 10 plates, 1:100,000.

Doelling, H.H., and Graham, R.L., 1972, Coal and geology map, Tropic Canyon quadrangle, *in* Doelling, H.H., and Graham, R.L., Southwestern Utah coal fields: Utah Geological and Mineralogical Survey Monograph Series no. 1, p. 244-245, scale 1:42,240.

Hereford, Richard, 1988, Geology of the Cannonville quadrangle, Kane and Garfield Counties, Utah: Utah Geological Survey Open-File Report 142, 17 p., scale 1:24,000.

DESCRIPTION OF MAP UNITS

QUATERNARY SURFICIAL DEPOSITS

Qa **Alluvium** -- Gravel, sand, silt, and clay in stratified deposits along most major drainages; percentages of clast size changes from drainage to drainage and is dependent on the nature of bedrock being eroded in the drainage basin; includes coarse (bouldery) unstratified and unsorted flash flood deposits in narrow canyons and slope wash and colluvium in broad valleys. 1.5 to 9 m (5-30 ft) thick in most drainages, may locally be thicker.

Qat_2, Qat_3
Level 2 and Level 3 Terrace Deposits -- Remnants of stream and pediment-mantle alluvium deposits preserved as remnants above present stream levels; similar to Qa alluvium but with larger percentages of bouldery clasts; some are dominated by quartzite and limestone clasts derived from the Canaan Peak Formation, others are dominated by basaltic andesite clasts derived from the Aquarius Plateau, and still others are dominated by clasts derived from the more resistant Cretaceous and Jurassic sandstones; in general, older deposits are preserved at higher levels above current larger stream valleys; level 1 deposits (none mapped in this area) are generally 6 to 18 meters (20-60 ft) above modern streams; level 2 are18 to 60 meters (60-200 ft); level 3 are higher than 60 meters (200 ft), with some deposits in excess of 150 meters (500 ft) above the major valleys (these numbers vary across the map area and some exceptions exist due to local geologic factors); 0 to 15 m (0-50 ft) thick.

Qea **Eolian and Alluvial Deposits** -- Well- to moderately sorted sand, silt, clay, and pebbles; deposited by wind, sheetwash, and local streams; windblown deposits slightly to mostly reworked by water; blanket broad surfaces, masking the bedrock from which much of the material is derived; locally bury and partly bury (and may include) coarser gravel deposits (terrace or pediment deposits); typically, deposits have accumulated over long periods of time and have developed a thick pedogenic carbonate (caliche) layer that is commonly exposed in fresh stream and human-made cuts. Mostly less than 7.5 m (25 ft) thick, a few deposits as much as 15 m (50 ft) thick.

Qc **Colluvium** -- Poorly sorted, subangular to subrounded pebble- to boulder-sized clasts, generally in a fine-grained clay to sandy matrix derived from local weathering and erosion of bedrock and surficial deposits; accumulates on low to moderate slopes and commonly moves downslope by slope creep and frost wedging; locally includes small landslides, talus, and alluvium. As much as 30 m (100 ft) thick.

TERTIARY

Claron Formation (Lower Tertiary)

Tcw **White member** -- White to light-gray limestone, very fine granular to microcrystalline with thin yellowish-gray mudstone interbeds mostly in middle and lower parts; early to middle Eocene fresh-water gastropods present in some beds. Caps Table Cliff Plateau and forms vertical cliffs or steep forested slopes. 152 to 168 m (500-550 ft) thick.

Tcp **Pink member** -- Pink, pale-orange, light-gray, and white limestone, commonly mottled pink or yellow with thin gray to red limy mudstone interbeds; very fine grained to fine grained, clastic; irregularly bedded to massive; unit is stained pink in color by interbedded red units; dark shell fragments are present in local thin dark-gray microcrystalline limestone beds; forms pink cliffs, columns, and spires where

deeply eroded or steep forested slopes; may include thin unmapped Pine Hollow, Grand Castle, or Canaan Peak Formations; 244 to 274 m (800-900 ft) thick.

unconformity

CRETACEOUS

Wahweap Formation (Upper Cretaceous)
(upper member probably not present in map area)

Kwl **Lower member** -- Light- to dark-brown sandstone, fine- to medium-grained, cross-bedded, lenticular, with interbedded olive-gray to tan mudstone; lower part forms steep slope with local ledges and is conformable on Straight Cliffs Formation. The lower member of the Wahweap correlates with the Masuk Shale Member of the Mancos Shale in the Henry Mountains Basin. 198 to 305 m (650-1000 ft) thick.

Straight Cliffs Formation (Upper Cretaceous)

Ksd **Drip Tank Member** -- Light-gray, gray-orange, and white sandstone, medium to coarse grained and locally conglomeratic, massive, cross-bedded, and cliff forming; base is reworked marine beach sand. The Drip Tank Member correlates with the Muley Canyon Sandstone Member of the Mancos Shale in the Henry Mountains Basin. 61 to 122 m (200-400 ft) thick.

Ksj **John Henry Member** -- Interbedded pale-yellow-orange, tan, and light-brown sandstone, olive-gray to tan mudstone, dark-gray to black carbonaceous mudstone, and coal; forms alternating cliffs and slopes; base may contain thin pebble conglomerate lenses and lower sandstone lenses may contain fragmentary *Inoceramus* shells; base rests unconformably on the lower member of the Straight Cliffs Formation; contains commercial coal deposits in at least two zones--an upper or Alvey zone and a lower or Christensen-Henderson zone. 213 to 305 m (700-1,000 ft) thick.

unconformity

Ksst **Combined Smoky Hollow and Tibbet Canyon Members** -- The Smoky Hollow Member consists of a white sandstone, medium to very coarse grained, conglomeratic, massive, cross-bedded, and cliff forming, 7.5 to 27 m (25-90 ft) thick, overlying interbedded sandstone, mudstone, carbonaceous mudstone, and a few very thin impure coal beds; Tibbet Canyon Member is tan to light-brown sandstone, fine grained, partly cross-bedded, cliff forming, and marine, is found beneath the Smoky Hollow Member, and intertongues with the Tropic Shale below. The Smoky Hollow Member is 34 to 91 m (110-300 ft) thick. The Tibbet Canyon Member is 24 to 55 m (80-180 ft) thick. Combined lower member is 58 to 140 m (190-460 ft) thick.

Kt **Tropic Shale** (Upper Cretaceous) -- Medium- to olive-gray marine shale; contains thin tan, yellowish-gray, or light-brown very fine-grained to fine-grained sandstone interbeds in upper 30 m (100 ft) and thin beds of bentonite and fossil-bearing limestone concretions near the base; forms steep slope. 183 to 274 m (600-900 ft) thick.

Kd **Dakota Formation** (Lower and Upper Cretaceous) -- Gray-orange or light-brown locally fossiliferous sandstone interbedded with light-olive-gray shale in upper half, moderately resistant; coal beds locally present in the middle of formation, coal beds are mostly thin, but are locally thick; dark-brown to black carbonaceous claystone, gray shale, and siltstone, and some beds of gray-orange to white coarse-grained sandstone in the lower half; locally conglomeratic at the base; forms ledges and slopes. Upper Cretaceous in age, except for local conglomeratic channels at the base which may be Lower Cretaceous in age; conglomeratic channels are probably separated from the remainder of the formation by an unconformity. 24 to 107 m (80-350 ft) thick, but mostly 24 to 61 m (80-200 ft) thick.

unconformity

JURASSIC

Jh **Henrieville Sandstone** (Middle Jurassic) -- White to pale-yellow, fine- to medium-grained, poorly sorted, calcareous sandstone, siltstone, claystone, and shale; contains scattered coarse grains; lower part (25 to 33% of formation) is planar-bedded siltstone, claystone, and shale of probable fluvial origin; upper part is mostly cross-bedded sandstone of eolian origin; entire unit forms cliff or steep slope; present only in the Tropic area (SW corner of Escalante 30'x60' and SE corner of Panguitch 30'x60' quadrangles); may correlate with part of the Escalante Member of the Entrada Sandstone or with the Salt Wash Member of the Morrison Formation; 0 to 70 m (0-230 ft) thick.

Je **Entrada Sandstone** (Middle Jurassic) -- Generally consists of upper, middle, and lower members, which are not mapped separately; upper or Escalante Member consists of 24 to 122 m (80-400 ft) of white, light-gray, pale-orange, and yellow-brown, fine- to coarse-grained, massive, high-angle cross-bedded, cliff-forming sandstone; the middle or Cannonville Member consists chiefly of 61 to 128 m (200-420 ft) of red-brown and gray-banded slope-forming silty sandstone and sandy siltstone; lower or Gunsight Butte Member is chiefly red-brown fine-grained, cross-bedded cliff-forming or earthy-weathering silty sandstone 46 to 111 m (150-365 ft) thick. Total Entrada Sandstone at any location is 122 to 305 m (400-1000 ft) thick.

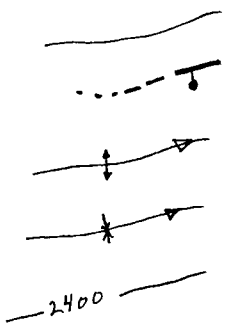
Carmel Formation (Middle Jurassic)

Jcw **Winsor Member** -- Chiefly red-brown siltstone, yellow-brown fine-grained sandstone, and gypsum. 15 to 46 m (50-150 ft) thick.

Jcp **Paria River Member** -- Consists of red mudstone and sandstone capped by chippy-weathering white or pink thin-bedded limestone; locally contains thick anhydrite and gypsum bed in southwest corner of quadrangle. 46 to 122 m (150-400 ft) thick.

Geologic Map of the Southeast Part of the Panguitch 30'x60' Quadrangle

Key to Map Symbols



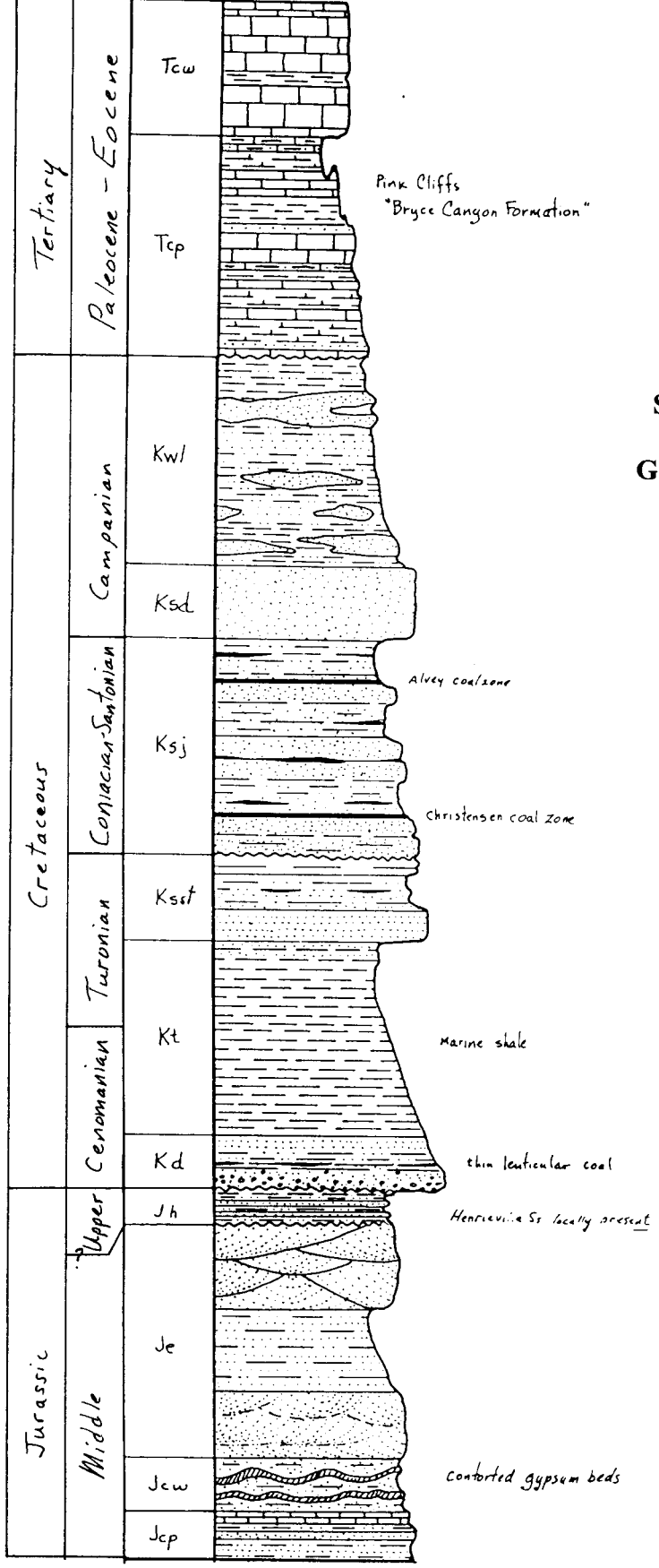
Contact -- includes approximately located

Fault -- dotted where concealed; bar and ball on down-thrown side

Anticline -- showing axial trace; arrow shows direction of plunge

Syncline -- showing axial trace; arrow shows direction of plunge

Structural contour -- contours in meters; drawn on top of Smoky Hollow Member of Straight Cliffs Formation



Lithologic Column

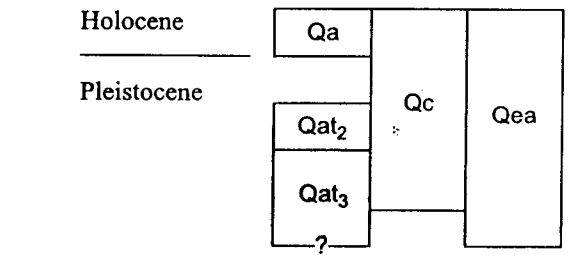
Southeast Part of the Panguitch 30'x60' Quadrangle, Garfield and Kane Counties, Utah and Coconino County, Arizona

CORRELATION OF MAP UNITS

SE Part of Panguitch 30' x 60' Quadrangle

Surficial Deposits

Quaternary



Bedrock Units

Tcw	Eocene	TERTIARY
Tcp	Paleocene	
unconformity		
Kwl	Campanian	UPPER CRETACEOUS
Ksd		
Ksj	Santonian	
unconformity	Coniacian	
Ksst	Turonian	
Kt		
Kd	Cenomanian	
unconformity		
Jh	Upper	Note: Locally there is a conglomerate at the base of the Dakota that is unconformably separated from the main mass of the Dakota above and unconformably separated from the Upper Jurassic below. Pollen analyses indicate the conglomerate to be Albian (Lower Cretaceous) in age (Doelling and Davis, 1989).
	———?———	
Je	Middle	JURASSIC
Jcw		
Jcp		